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ABSTRACT

Reading, writing, and computing, which are interrelated and can thrive on each other for literacy and intellectual growth, are in the process of becoming linked in instructional practice. As reading and writing become more demanding, their task is eased with computer use. The computer seems to provide the connection between composing, comprehension, and motivation, and thereby provides a highly supportive system. Reading, writing, and computing share the common skills of visual perception, auditory perception, thinking, and comprehension, and each skill reinforces the others. (Children who read and write well are the most effective in utilizing the computer.) A well presented story can do much to motivate children to write, as well as strengthen their writing skills, vocabulary development, sequential orders, organization, and creativity. The interaction possibilities presented by technology also add a unique dimension where children "enter" the story and interact with the characters. New computer controlled videodisks make it possible to store original materials in remote locations where any number of students can simultaneously access the same materials. With computers, the affective impact of literature can be made immediate, thereby promoting an individual's understanding, interest in, and desire to read. Eight footnotes are provided. (DJR)

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READING, WRITING, and COMPUTING

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READING, WRITING, and COMPUTING!

The link between the reading and writing processes has recently generated a great deal of research. The result is that the two have come to be viewed as flip sides of the same coin. Writing well depends very much on reading good writing. And now computer-based technology is being added to the mix.

One of the few areas where we have evidence of the computer amplifying learning is in the area of writing and reading. All three processes--reading, writing, and computing--are complex intellectual activities that involve gathering, organizing, and producing information. If one process is neglected there seems to be a negative effect on the others.[1]

Writing, reading, and computing are in the process of becoming linked in instructional practice. As children use the computer to move from the simple drawings of letters, to the revision of inner speech, to formal essays their ability to express themselves is dependent upon their ability to develop related technologically-based language arts concepts.[2]

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1. Adams, Dennis, M. Computers and Teacher Training: A Practical Guide. New York: Haworth Press, 1985.

2. Adams, Dennis, M. "Computer Based Children's Literature," Computers, Reading and Language Arts, 1985.

Reading, Writing, and Computer Connections

Reading and writing are related and different. Reading refers to obtaining meaning from printed material. Writing refers to expressing thoughts and ideas. Putting them together with computing forms a highly supportive system. All three are processes that help us construct and extend meaning.

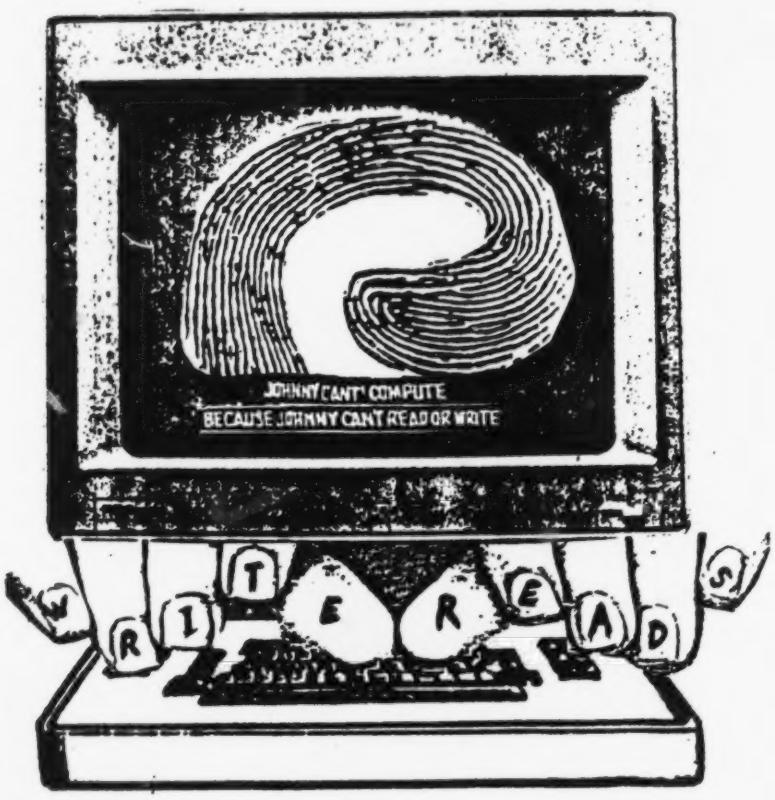
Reading, writing, and computing share common skills. Reading deals with printed or written words, writing with the production of these words, and computing with both. These skills include visual, auditory perception, thinking, and comprehension. Visual perception allows the reader and the writer to realize that many complex letter shapes fit together to form words. Auditory perception involves taking the sounds in the language and relating them to the different letters. Computing increasingly involves speech and visual skills.

Thinking enters the reading process when a child analyzes print and extracts meaning. When writing, a child must use organized thoughts and ideas to develop a conceptual image and then express this image. Computing, again, involves both.

Comprehension is dependent on the mix of visual, auditory, and cognitive processes. Although comprehension is the end result of reading, it also plays a part in the writing process. Without comprehension, not much reading or writing can take place. A child must first understand her purpose for writing. For the written work to make sense, she must continue to understand and logically express her thoughts. As the level of

students' reading comprehension increases, so does writing complexity.

The computer has become an ally in teaching comprehension. In our informal testing of elementary school students, we found that reading, writing, and computing shared common skills, and that one reinforced the others. Children who performed well in one area tended to do well in the others.



Children Who Read and Write Well Are Most Effective In Utilizing the Computer

Children who read well also write well, while those who read poorly usually write poorly. Evaluations of children's writing tended to follow the specific format of what they read--whether

it was their basal reading text or the literature they chose.[3] Barbara Eckhoff's work with second graders supports these findings. She found students' writings contained features of their reading texts.[4]

Children reading in a basal which closely matched the style and complexity of literary prose wrote sentences using complex verb forms, infinitive and participle phrases, and subordinate clauses. Their classmates who read in a basal with a simplified style wrote generally in the same less elaborate style. It does appear that the publisher who uses simplified sentence structure in hopes of easing a child's learning to read may be hindering his writing.

Children must hear and read literature in order to write well. Next to direct experience, the reading that children do (either on or off the computer) is usually their most important source of new words and ideas. A well presented story can do much to motivate children to write as well as strengthen writing skills, vocabulary development, sequential order, organization, and creativity. The interaction possibilities presented by technology adds a unique dimension where children "enter" the story and interact with the characters.

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3. Adams, Dennis, M. "Does What You Read Influence How You Write?" The Leaflet: Journal of the New England Association of Teachers Of English, Spring, 1983.

4. Eckhoff, Barbara, "How Reading Affects Children's Writing", Language Arts Journal, 60(5), May, 1983.

New computer controlled video disks make it possible to store original materials in remote locations. Any number of students--in different schools--can obtain simultaneous access to the same materials.

Books are entered into these systems (like the one developed by Sony Video Communications) with a scanner that can put 100 books into an inch of shelf space. And unlike conventional books, these never wear out. Pictures can be stored along with the printed word. This results in new forms of video, print interaction which hold unmeasured potential for revamping the reading process.

The reading and writing connection itself, is enhanced through the use computer technology. When composing, the student is engaged in a writing-reviewing (reading) process. Each time she presents written information, it must be read back silently and reviewed on the monitor to insure proper structure. Even the technology now available in most schools will allow the student to interact with a children's story--or write and revise a compostion of his own. Whether it's pre-writing, writing, or revising, the technology has become an integral part of the process.

Computer Based Reading and Writing

In our survey of the field we found that two of the more disconcerting problems facing teachers today are how to approach the new computer-based learning technology (the "new literacy") and how to overcome student indifferences or sheer rejection of reading and writing (the "old literacy"). Far from being

opposed to one another, we now have the ability to reach toward a fusion of man's richest intellectual invention, the computer, and his most powerful medium for the use of language over time, literature. With computers, we can make the affective impact of literature immediate. People hear and see things and react to them in a different manner than when print is used alone.. The result can promote an individual's understanding, interest in, and desire to read.[5]

The research suggests that computer-mediated text may enhance comprehension among younger and poorer readers by stimulating more metacognitive activity.[6] Our informal survey also suggests that students using computers (for comprehension) will score higher on exams than students who read and study on their own.[7]

Reading Skills Used in Programming

- Mastery of a sight vocabulary
- Use of explicit rules and syntax
- Comprehension of whole program
- Response to semantic cues
- Proofreading of program

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5. Adams, Dennis, M. "Interactive Children's Literature", Reading Horizons, Summer, 1986.

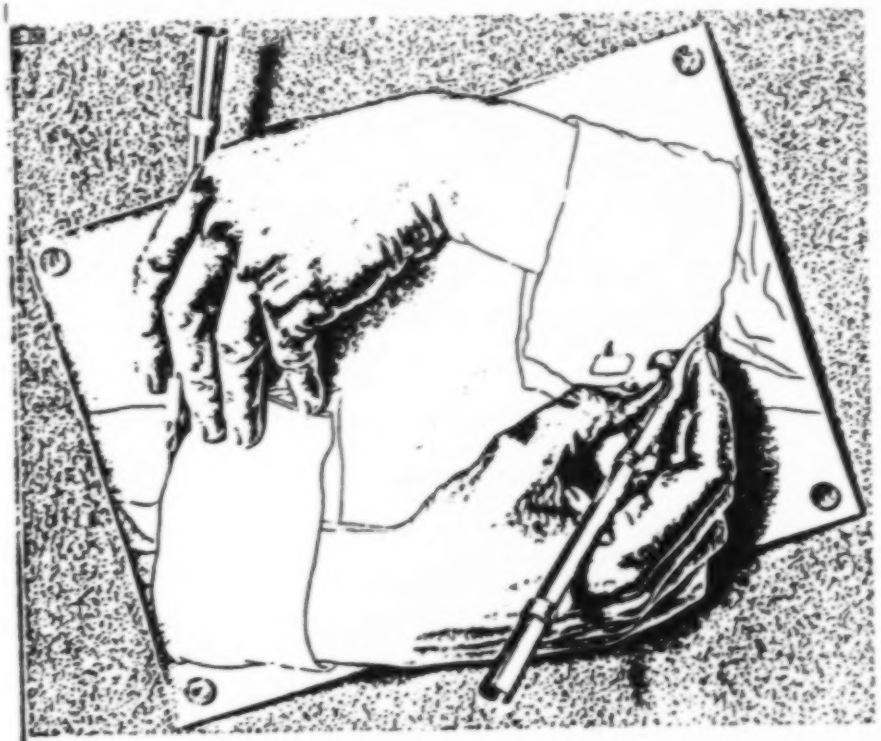
6. Reinking, David; Schreiner, Robert. "The Effects of Computer-Mediated Text on Measures of Reading Comprehension and Reading Behavior". Reading Research Quarterly, Fall, 1985.

7. Adams, Dennis M. "Experience, Reality and Technology", The Journal of Experiential Education, Fall, 1985-

Interaction with the computer appears to provide a stimulus for the reader unmatched by conventional print technology. Print size may be increased, speed may be altered, and graphics can be created when using computer-mediated text. The control of text information can reside with either the student or computer. This

allows the students to interact with the computer, which provides manipulation of and interaction with the text. Information may be externalized into background knowledge, important aspects can be pointed out, and checking for understanding. Students have immediate access to: 1) defintions of key vocabulary, 2) a simpler, less technical version of the text, 3) supplemental background information, and 4) pictoral presentation of text ("mapping", for example).[8]

Using the computer for composing also enhances students' motivation for writing. Mistakes and corrections are less bothersome, so the students are more willing to revise. Composing on a computer is also much faster than using a pencil. For children



M. C. Escher, *Drawing Hands*.

8. Reinking, David; Schreiner, Robert. "The Effects of Computer Mediated Texts on Measures of Reading Comprehension and Reading Behavior". Reading Research Quarterly, Fall, 1985.

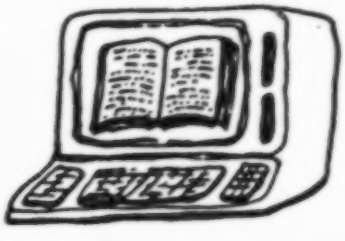
who don't like to type, a peripheral device is available which allows them to print, or write in longhand, on a touch sensitive plate, and the computer sets it up on the screen in typewriter-like print. About the only thing the computer doesn't do is compose for the student.

Reading, writing, and computing are interrelated and can thrive on each other for literacy and intellectual growth. And as reading and writing become even more demanding, their task is eased with computer use. The computer seems to provide the connection between composing, comprehension and motivation.

The thinking processes involved are also related. Whether print on paper, or on a monitor, children must reconstruct the writers meaning. By reading and using the computer students can improve the clarity and style of their writing. In addition, the computer aids in the rewriting which is so essential in achieving a good written product.

Prior knowledge about the world and language are needed for either production or for understanding. Reading, writing, and computing can be viewed as a form of rehearsal for one of the other skills. Integrating these skills can enhance students' learning in all three areas.

Computer-based reading activities should:



- **Foster active student involvement**
- **Address individual skill deficits**
- **Lead toward comprehension and higher level skills**
- **Accommodate the child's learning style**
- **Go beyond the "electronic workbook or page-turner"**